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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,048	09/11/2003	Louis D. Lanzcrotti	BUR920010146US2	7268
29154	7590	05/04/2006	EXAMINER	
FREDERICK W. GIBB, III GIBB INTELLECTUAL PROPERTY LAW FIRM, LLC 2568-A RIVA ROAD SUITE 304 ANNAPOLIS, MD 21401			QUACH, TUAN N	
			ART UNIT	PAPER NUMBER
			2826	
DATE MAILED: 05/04/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

31

<b>Office Action Summary</b>	<b>Application No.</b> 10/660,048	<b>Applicant(s)</b> LANZEROTTI ET AL.	
	<b>Examiner</b> Tuan Quach	<b>Art Unit</b> 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9-13 and 32-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-13 and 32-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

TH

Tuan Quach  
Primary Examiner

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/17/06 and 1/5/06 has been entered. The previous holding of election is withdrawn in view of the claims as amended drawn to a semiconductor layer and claims 9-13 and 32-43 are examined together.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0717435 A1 ('435) singly or with Lippert et al.

Regarding claims 9-13, '435 teaches a semiconductor layer including for use in bipolar transistor comprising carbon atoms and doped, e.g., ion implanted, dopants such as boron, in the semiconductor layer to form device components, whereby the carbon is incorporated throughout the layer to control diffusion of the ion implanted dopants in the vertical and/or lateral directions within the semiconductor layer. See column 2 line 31 to column 9 line 25. The doped region correspond to the implanted region device region selected wherein the control diffusion in the vertical or lateral diffusion is sought, thus corresponding to the carbon limiting a size of the doped region. '435 lacks primarily the recitation of the dopant quantity to reduce the resistance to less than the specified value.

Lippert et al. (either WO 98/26457 or 6,750,484, of record, as being equivalents, subsequent referencing to 6,750,484) teaches carbon atoms, dopant interacting with carbon atoms, the carbon atoms limit outdiffusion of the dopant in the semiconductor base layer 3 and to reduce outdiffusion region 5. See column 2 line 56-62, column 3 line 50 to column 4 line 11 wherein the boron concentration between  $5 \times 10^{18}$  and  $10^{21}$   $\text{cm}^{-3}$  are also shown. See the corresponding description in '457

Accordingly, it would have been obvious to one skilled in the art in practicing '435 to include the boron concentration to the desired or sufficient level quantity in the base layer wherein the resistance of the inner base can be reduced as taught by Lippert et al. The resistance being less than 4K ohms/cm<sup>2</sup> would have been inherent or

Art Unit: 2826

otherwise such optimization would have obvious, given the teachings of Lippert et al., in the absence of evidence to the contrary. Any associated function, e.g., increase breakdown voltage or reduced resistance would follow, absent evidence to the contrary.

Note further that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference; see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29(CCPA 1971)\*, In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir.1990) (emphasis in original). The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

Art Unit: 2826

Regarding claim 12, the use of the silicon germanium is also shown, column 3 line 8. Regarding claim 13, the selection of the desired portion of the semiconductor layer including a central portion, to the extent such central region can be determined, would have been a matter of design choice and would have been obvious or encompassed therein.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '435 in view of Lippert et al. as applied to claims 9-13 above, and further in view of Sakamoto and Bisaro et al.

The references as applied above teach the same dopant of boron but does not enumerate all the various remaining dopants, e.g., aluminum, gallium, indium, and titanium.

Sakamoto 5,750, 443 teaches column 3 lines 40-43 the conventional p type dopants including boron, gallium or aluminum or the like. Bisaro et al. 56,141,894 also teaches the various suitable dopants including boron, gallium, titanium, indium, etc. See column 3 lines 35-43.

It would have been obvious to one skilled in the art in practicing the above invention to have employed the conventional dopants as delineated in Sakamoto and Bisaro et al. since such correspond to conventional dopants as evidenced by Sakamoto and Bisaro et al. Official notice is alternatively given regarding the use of any suitable conventional dopants in place of boron enumerated above.

Claims 32-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over '435 taken with Lippert et al. and Racanelli.

Art Unit: 2826

Regarding claims 32-43, '435 and Lippert et al. are applied as above and does not recite the single crystalline and polycrystalline region in the semiconductor layer and the doped region in the single crystalline layer.

Racanelli 6,410,975 B1 teaches the semiconductor layer including polycrystalline region 121 as base contact, e.g., over field oxide or STI region 110 and single crystalline region 120 over silicon crystalline region of substrate 101 wherein the region 120 serves as the base region. See column 3 line 60 to column 9 line 65.

It would have been obvious to one skilled in the art in practicing the above invention to have included the respective single crystalline and polycrystalline region in the semiconductor layer wherein the application to bipolar transistor can be made to provide components for the device in question. The appropriate doping to obtain the reduced resistance in claims 33 and 39 additionally are shown in Lippert et al. above. The provision of the shallow trench isolation, e.g., claims 35, 41 additionally correspond to or is obvious over conventional isolation including the isolation region in Racanelli above. Regarding claims 36-37 and 42-43, such function would have been inherent or obvious when the carbon is incorporated wherein the doped region is confined vertically or laterally as evidenced by '435 and wherein the strain in the layer would be reduced upon the incorporation of the carbon. The alignment of the regions in claim 34 and 40 would have been conventional and obvious given the teachings in Fig. 4 including region 429, 425, and 430, and 432.

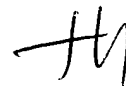
Applicant's arguments with respect to claims 9-13 and 32-43 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2826

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tuan Quach whose telephone number is 571-272-1717. The examiner can normally be reached on M-F from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Nathan Flynn, can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**Tuan Quach**  
**Primary Examiner**